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10/645,665

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Raj Dhindsa

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LOWE HAUPTMAN HAM & BERNER, LLP  
1700 DIAGONAL ROAD  
SUITE 300  
ALEXANDRIA, VA 22314

EXAMINER

LE, TUNG X

ART UNIT

PAPER NUMBER

2821

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/645,665

Applicant(s)

DHINDSA ET AL.

Examiner

Tung X. Le

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on the amendment submitted 11/21/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 16-19, 21-23, 25-51, 65-70, 72, 74 and 77-79 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 34, 38, 42-51 is/are allowed.
- 6) ☒ Claim(s) 16-19, 21-23, 25-33, 35-37, 39-41, 65-70, 72, 74 and 77-79 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 8/20/2007.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

This Office Action is in response to the Applicant's amendment submitted on November 21, 2007. In virtue of this amendment:

- Claims 1-15, 20, 24, 52-64, 71, 73, and 75-76 are cancelled; and
- Thus, claims 16-19, 21-23, 25-51, 65-70, 72, 74, and 77-79 are pending in the instant application.

#### ***Rule 130, 131, or 132 Affidavits***

1. The affidavits submitted on November 21, 2007 under 37 CFR 1.131 are not accepted since *the triode reactor* shown in exhibit 1 is not provided in the specification.

Therefore, the pending claims 16-18, 21-23, 25-33, 35-37, 39-41, and 65-68 are being rejected as follows:

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 19, 21, 25-33, 35-37, 39, 40-41, 69-70, 72, 74, and 77-79, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitation of "*three or more of the frequencies to the first electrode*" recited in lines 4-59 of claim 19 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*the three or more frequencies to the first electrode*" recited in line 4 of claim 21 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*the plasma excitation source arrangement including circuit for coupling of the three or more frequencies to the first electrode*" recited in lines 7-9 of claim 25 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*the plurality of the frequencies are applied to the first frequency*" recited in line 7 of claim 26 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*the three or more frequencies to the first electrode*" recited in line 3 of claim 35 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*the first electrode to be responsive to each of the three or more frequencies during the first time period*" recited in lines 2-3 of claim 39 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*applying three or more frequencies to the first electrode*" recited in lines 2-3 of claim 40 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*the three or more frequencies to the first electrode*" recited in line 4 of claim 41 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

The limitation of "*applying the first, second, and third frequencies to the first electrode*" recited in lines 9-10 of claim 69 is neither explicitly nor implicitly described in the specification to a person skilled in the art.

Claims 27-33, 36-37, and 38 are also rejected under 35 U.S.C. 112 first paragraph, since they are dependent on claim 25; and claims 70, 72, 74, and 77-79 are also rejected under 35 U.S.C. 112 first paragraph, since they are dependent on claim 69.

#### ***Specification***

4. The amendment filed November 21, 2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The limitations of "*three or more of the frequencies to the first electrode*" recited in lines 4-5 of claim 19; "*the three or more frequencies to the first electrode*" recited in line 4 of claim 21; "*the plasma excitation source arrangement including circuit for coupling of the three or more frequencies to the first electrode*" recited in lines 7-9 of claim 25; "*the plurality of the frequencies are applied to the first frequency*" recited in line 7 of claim 26; "*the three or more frequencies to the first electrode*" recited in line 3 of claim 35; "*the first electrode to be responsive to each of the three or more*

*frequencies during the first time period*" recited in lines 2-3 of claim 39; "*applying three or more frequencies to the first electrode*" recited in lines 2-3 of claim 40; "*the three or more frequencies to the first electrode*" recited in line 4 of claim 41; and "*applying the first, second, and third frequencies to the first electrode*" recited in lines 9-10 of claim 69.

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Claim Objections***

5. Claims 64, 74, and 77-79 are objected to because of the following informalities:
- Claim 64 should be deleted since it is cancelled;
- Claim 74, line 1, "71" should be changed to --69--;
- Claim 77, line 1, identifier "New" should be changed to --Previously Presented--;
- Claim 78, line 1, identifier "New" should be changed to --Previously Presented--;
- Claim 79, line 1, identifier "New" should be changed to --Previously Presented--.
- Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 16-18 and 22-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Howard (U.S. 2005/0022933 A1).

With respect to claim 16, Howard discloses in figure 1 a vacuum plasma processor (10) comprising a vacuum chamber (16) including an electrode (26 and 28), the chamber being associated with a reactance (having a matchbox not shown), the electrode and the reactance being arranged for coupling plasma excitation fields to gas (having gases into reactive radicals and initiating a plasma) in the chamber (16), the chamber being arranged for carrying a workpiece (22) while the plasma excitation fields are coupled to the plasma (14), and a plasma excitation source arrangement (12, 18, 20) for enabling the electrode (28 and 26) and reactance (not shown - matchbox) to couple the electric energy at three or more frequencies (paragraphs [0023-0025]) to the plasma (14) incident on the workpiece (22), the plasma excitation source arrangement being arranged for applying three or more of the frequencies to the electrode (figure 1), the three or more frequencies being such that the excitation of the plasma by the three or more frequencies simultaneously causes different phenomena to occur in the plasma (paragraphs [0007 and 0023]), wherein the phenomena affect plasma ion energy (paragraph [0009]), plasma ion density (paragraph [0008]) and plasma chemistry of the plasma incident on the workpiece (paragraph [0025]).

With respect to claim 17, Howard discloses that the plasma excitation source arrangement (12, 18, 20) is arranged for causing the three or more frequencies to be simultaneously applied to the plasma (figure 1, paragraph [0023]).

With respect to claim 18, Howard discloses in figure 1 that the electrode (26 and 28) for carrying the workpiece includes a first electrode (26) in the chamber and the reactance includes a second electrode (88) in the chamber (16).

With respect to claim 22, Howard discloses in figure 1 that the plasma excitation source arrangement (12, 18, 20) includes at least one variable frequency RF source (paragraph [0023]).

With respect to claim 23, Howard discloses in figure 1 that the plasma excitation source arrangement (12, 18, 20) includes circuitry (30, 32, 34, 38) for (a) providing an impedance match (matchbox – not shown) between sources (12, 18, 20) of the frequencies and the plasma (14) and (b) decoupling the frequencies associated with the different sources from each of the other sources (figure 1).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard et al. (U.S. 2005/0022933 A1).

With respect to claim 65, Howard discloses all of the claimed subject matter, as expressly recited in claims 15, 16, and 25, except for specifying that the first, second, and third frequencies are in ranges of 100 kHz to 10 MHz, 10 MHz to 150 MHz, and 27 MHz to 300 MHz, respectively. However, such a difference of in frequencies is not of



patentable merits since the range of the frequencies of the power sources can be selected at a desired level based on a particular application or environment of use and such a selection of frequencies would have been involved with only routine skills in the art. Therefore, to employ the power sources of Howard in the frequencies ranges of 100 kHz to 10 MHz, 10 MHz to 150 MHz, and 27 MHz to 300 MHz, respectively, as claimed for effectively controlling of plasma energy would have been deemed obvious to a person skilled in the art.

With respect to claim 66, Howard discloses that the plasma excitation source arrangement (12, 18, 20) is arranged for simultaneously applying the first and second frequencies to the first electrode (26) while applying the third frequency to the second electrode (figure 1).

With respect to claim 67, Howard discloses in figure 1 that the plasma excitation source arrangement (70) is arranged for simultaneously applying the first, second, and third frequencies to the first electrode (26) while the second electrode (28) is at a reference potential (paragraph [0023]).

#### ***Allowable Subject Matter***

10. Claims 34, 38, and 42-51 are allowed.

11. The following is a statement of reasons for the indication of allowable subject matter:

Prior art of record fails to disclose or fairly suggest:

- A vacuum plasma processor for a workpiece comprising a filter arrangement of the circuitry, the filter arrangement being connected to the second electrode for

preventing the substantial flow of current at least one of the plurality of frequencies between the second electrode and the reference electrode, in combination with the remaining claimed limitations as claimed in independent claim 34.

- A vacuum plasma processor for a workpiece comprising a reference potential during a first workpiece processing time period and for selectively supplying the same frequency to the first and second electrodes during a second workpiece processing time period, in combination with the remaining claimed limitations as claimed in independent claim 38.
- A vacuum plasma processor for processing a workpiece comprising the electrode arrangement including first and second electrodes respectively on opposite first and second sides of the region and a third electrode on the first side of the region, the third electrode being peripheral to and electrically insulated from the first electrode, a plasma excitation source arrangement for deriving electric energy at plural frequencies, the plasma excitation source arrangement being arranged for selectively coupling energy at the plural frequencies to the first, second and third electrodes for causing current at least one of the plural frequencies to flow in the third electrode without current at all of the frequencies flowing in the third electrode, in combination with the remaining claimed limitations as claimed in claim 42 (claims 43-51 are allowed since they are dependent on claim 42).

- Claims 19, 21, and 39 would be allowable if support for the claimed limitations *"three or more of the frequencies to the first electrode"* is provided in the specification of the claimed invention, and if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
- Claims 25-33, 35-37, 40-41, and 68 would be allowable if supports for the claimed limitations *"the plasma excitation source arrangement including circuit for coupling of the three or more frequencies to the first electrode"*, *"the plurality of the frequencies are applied to the first frequency"*, *"the three or more frequencies to the first electrode"*, *"the first electrode to be responsive to each of the three or more frequencies during the first time period"*, *"applying three or more frequencies to the first electrode"*, and *"the three or more frequencies to the first electrode"* recited in claims 25, 26, 35, and 40-41, respectively, are provided in the specification of the claimed inventions.

#### **Remarks and Conclusion**

12. Applicant's arguments filed 11/21/2007 have been fully considered but they are not persuasive.

- Claims 16-18, and 22-23 remain rejected under U.S. C. 102(e) as being anticipated by Howard and claims 65-67 remain rejected under U.S. C. 103(a) as being unpatentable over Howard (see details provided in sections 6-9 above).
- The rejection of claims 19, 21, 25-33, 35-37, 39-41, and 68 in the Office Action mailed on May 22, 2007 remain valid if there is NO support for the limitation

*"applying three or more frequencies to the first electrode"* provided in the specification of the claimed invention.

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

#### ***Inquiry***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung X. Le whose telephone number is 571-272-6010. The examiner can normally be reached on 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens can be reached on 571-272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Application/Control Number:  
10/645,665  
Art Unit: 2821

Page 12

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Examiner  
Tung Le  
AU 2821  
December 29, 2007

A handwritten signature in black ink, appearing to read 'Thuy V. Tran', is positioned above the printed name and title.

**THUY V. TRAN**  
**PRIMARY EXAMINER**